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THE INTEGRATION OF INDUSTRY IN THE UNITED STATES.

IN an article entitled "The Concentration of Industry in the United States," contributed to the *Yale Review* for May, 1898, the present writer made the attempt to measure, as far as the then existing statistical data permitted, the undoubted tendency shown by industry in almost all branches of manufacture to become concentrated in fewer and larger establishments. The effort was at the same time made to show the motives dictating this centralization of industrial work, and the social and economic results that might be anticipated from it. In particular was it sought to distinguish clearly between this purely normal progress in the evolution of industry and the abnormal or forced concentration, if the expression may be used, that was taking place through the formation of the so-called trusts.

It is our desire, in the present paper, to call attention to, and comment upon, the significance of another phase of the industrial evolution taking place in the United States, which, though akin to that considered in our former communication, yet possesses features marking it off sharply from that movement. This is the tendency towards what we have designated the integration of industry. It is a tendency which, though it has been at work for some time, has only in very recent years become one of marked prominence. At the present time, however, it constitutes, as it is believed this paper will show, the fundamental force now at work for the reorganization of our industrial system. Through it alone can be established the significance of recent important happenings.

By integration of industry is meant the knitting together, so as to form one compact harmonious whole, of all the related branches, or all the necessary processes, of any great department of industrial work. As such, it is evidently a movement quite distinct from that of concentration of industry. Concentration indicates the bringing together of likes under central management, as where all the coal mines or all the blast fur-

naces or rolling mills are brought under the control of one or a few parties. Integration indicates the bringing together of dissimilar, but interdependent, branches of an industry, so that complete harmony may be obtained among them, and the undertaking contain within itself a complete control of all the factors necessary for the successful and uninterrupted prosecution of its work. This is what takes place when the same management acquires control of such widely dissimilar, but essentially dependent, branches of industrial work as the mining of coal and ore, the operation of railways and steamships for its transportation, the extraction of lime, the working of coke ovens, the manufacture of pig, its conversion into billets, bars, sheets, and what not, and from them the manufacture of wire, nails, rails, tin plate, structural material, or even bridges ready for final consumption. We have given as an illustration probably the most perfect example of integration that has yet taken place, and we shall have occasion to consider it more in detail in another place. The operation of this force, however, can be seen in almost every branch of industrial enterprise. Wherever a brewer decides to make his own barrels or to raise his own hops, wherever a bicycle manufacturer undertakes the manufacture of his own tubing or tires, this tendency may be seen at work.

Our study of this movement, if it is to be at all adequate, should include the three points of: first, a description of the extent to which it has advanced and an account of its more important manifestations; second, an examination of the motives that are responsible for its rise and progress; and, third, an attempt to determine — as far as conditions will permit — its probable effect upon efficiency of production and the general welfare of society.

Of recent examples of integration in this country, far the most important and striking is that which has just taken place in the iron and steel industry through the creation of the United States Steel Corporation. In no other case can we find such a perfect working of the forces of integration. In other cases, integration has taken place almost unconsciously, and as the result rather than the object of the steps taken. Here we have an instance where the benefits of integration

were clearly seen in advance, and an enormous combination brought about for their realization.

No greater mistake could be committed than that made by most writers on this corporation, who have seen in it but a combination on a larger scale similar to those of its constituent companies. The latter, with the exception of the Carnegie Company, were pure types of the concentration of industry. The former is a pure type of integration of industry.

As the creation of this corporation represents in such a complete way this whole movement of integration, the motives or causes responsible for it, the conditions making it possible, and the probable results of its action, it is worth our while to describe its rise with some degree of particularity.

Until 1895 or 1896 the development of the iron and steel industry in the United States may be said to have followed the normal course of most expanding trades. It was marked by the gradual concentration of work in fewer and larger establishments and a parallel geographical centralization in the more favored localities. While it was evident that a dominant position was being attained by certain establishments, this dominance was due almost entirely to the natural advantages that they enjoyed and the skill with which they were managed. Their growth, in a word, was one of natural expansion through the addition of new mills and the development of established lines of work. Only to a limited extent was increase in size obtained by the absorption of hitherto independent plants. There was little or no idea of one or a few establishments reaching such a strength as to be able to exercise monopolistic powers and fix prices without regard to active competition.

This was the condition of affairs up to the closing years of the last century. Suddenly a new means of building up huge concerns was adopted. The possible economies resulting from centralization of work in large plants and production upon a large scale had nearly been reached as regards the actual operations of manufacture. It was now seen that there lay a great field for economies outside the work of production proper, through a better control and organization of the factors of distribution. If a union of the forces of all or a con-

siderable number of manufacturers of the same product could be secured, it would be possible to obtain raw materials at a more advantageous rate or with greater certainty, production could be made to correspond more nearly to demand, markets could be reached more directly, and new ones opened up where existing outlets were insufficient, transportation charges could be reduced, and, finally, if a sufficient control of output could be secured, a more positive influence could be exerted upon the fixing of the prices at which the commodities manufactured would be marketed.

It was the effort to realize these considerations that led to the second phase in the history of the organization of the iron and steel industry in this country. This phase is the one marked by the formation of the great national companies, or so-called iron and steel trusts, through the merging of hitherto independent concerns. In rapid succession there were organized the Federal Steel Company, the National Tube Company, the American Steel and Wire Company, the American Tin Plate Company, the American Steel Hoop Company, and the American Sheet Steel Company, to mention only those which afterwards went into the United States Steel Corporation, each with its forty, fifty, or hundred millions of capital.

Now the characteristic of this period of transformation was that, in the formation of these huge concerns, the motive was the union of likes; that is, the bringing together under the same management of plants manufacturing the same products. It was as if a vessel of several classes of dissimilar particles had been suddenly agitated, and the members of each class had, on the instant, rushed together to form single independent homogeneous aggregations. There was thus constituted a great company for the manufacture of tin plate, another for the making of steel hoops and related articles, another for sheet steel, etc.

For a time it seemed, to the outside public at least, that this was the final step in the evolution through which the industry was passing, and that the immediate future would be devoted to the strengthening of the position obtained by each of the companies. But no sooner was this movement accomplished than new forces were seen to be at work. As field

after field came under the central or unified form of organization, the companies in which this organization was vested came more and more into direct contact with, and dependence upon, each other. The finished product of the one was the raw material of the other. One company was the chief purchaser of the products of another, taking in cases a quarter, a half, or even a greater proportion of the entire output of the latter. One company was thus in a position powerfully to control the operations of the others. In numberless ways this dependence of one field upon another led to friction and difficulties whose seriousness was proportionate to the size of the companies concerned.

This condition of affairs could not last long, and signs soon began to be manifest that great plans were on foot for its correction. To do this, there were but two lines of action open. One was that each of the companies should seek to gain its independence of the others by the enlargement of the scope of its operations, so that it would itself mine or manufacture the materials used in its operations. The other was that the different companies could make some arrangement among themselves by which their interests would be harmonized.

Efforts were at first directed towards the first-named method. One after another the different companies began to formulate plans for the erection of mills to manufacture products embraced within the field of operations of the other companies. It needs but a casual study of the situation of affairs to see where this policy, if adhered to, would have led. It meant a gigantic struggle between the companies. The company manufacturing sheet steel, for example, could not see with indifference the companies which took almost its entire product reach a position where they were no longer its customers. If they succeeded in doing this, the former company had but one alternative, if it was to remain in the business,—that of itself building mills for the conversion of its products into articles ready for final consumption. The announcement by one company that it intended building mills for the production of articles which it had formerly purchased from a second company was consequently immediately followed by announcements of the second company that it would retaliate by enter-

ing the field of the first, and erect mills for the conversion of its products for which it could no longer secure purchasers on an adequate scale. These were no idle threats. It is well known that definite plans for such action were, in many cases, formulated, and the preliminary operations for their execution begun. The tremendous danger to all parties, if this movement had been allowed to continue, was quickly seen. Efforts were, therefore, turned to the second method of bringing about harmony,—that of uniting the interests of the companies in some way. The powerful firm of J. P. Morgan & Co. was appealed to. The result was the formation of the United States Steel Corporation, with its billion, one hundred million, dollar capitalization.

With the formation of this corporation the evolution in the organization of the iron and steel industry entered upon its third and, as yet final, phase. It constitutes, if the expression may be permitted, combination carried to its second power, being, as it were, a combination of combinations. That in character it is essentially different from previous combinations, which had in view merely the concentration of industries for the purpose of controlling production and prices, is manifest in the view of the conditions leading to its foundation. The motives that were at work were purely those for bringing about an integration of related interests. It must be remembered that the companies which were united were not essentially competing concerns, as regards the disposition of their products. Had the motive been primarily one to lessen competition, the union would have taken place along different lines. The insistence that Mr. Schwab lays upon this point, in his testimony before the Industrial Commission, must be taken as a sincere expression of opinion, and not one dictated by business policy.

Mr. Schwab, moreover, brings out this point with great clearness in his article contributed to the *North American Review* for May, 1901. "The iron industry," he says, "was kept back in this country for many years, because there was no connection between the various industries on which it depended. The ore deposits were owned by one set of men. The coal deposits were owned by another set. The coke was

made in a hundred different places, scattered throughout several States, under different management. The mills and furnaces, in turn, were owned separately; and, when these mills and furnaces, having bought their iron here and their coke there and their other products elsewhere, finally produced their iron and steel, there were still other processes that the product had to go through before it could be finally landed in the market. Everything was disconnected and disjointed. It was not until the whole process was welded into a continuous chain under one management that the American iron industry began to make its giant strides which have now carried it into a position where it dominates the whole world."

If there was any doubt in this matter, one has but to follow the subsequent policy of this corporation to have a verification of the position that has been taken. The new corporation has spared no expense or effort to acquire certain properties, such, for example, as ore deposits and facilities for lake transportation, which were essential for the complete rounding out of the scheme of controlling all of the factors entering into the production of finished articles from the raw materials. It is strictly in line with the same policy that the American Bridge Company and the Shelby Tube Works were acquired, as through them the products of its other departments can be directly marketed as finished products.

On the other hand, the corporation has looked with perfect equanimity upon the building up of other strong properties in fields in which it already had a sufficient number of mills, such as is seen in the combination of steel properties under the control of the Pennsylvania Railroad, the Colorado Iron and Fuel Company, the Republic Iron and Steel Company, and scores of others that might be mentioned. Were the crushing out of competition in view, these would be the properties that would have been sought.

In our account of the formation of this corporation we have spoken as if it were a union of concerns, each having its special field of operations. To this, however, there was one important exception. The Carnegie Company occupied a unique position in the iron and steel trade in the United States. It was, in the first place, much the most important

concern in the trade. Roughly speaking, it made from 25 to 30 per cent. of the finished iron and steel product in the country. It mined all the ore that it used, or over four million tons annually, and owned a large percentage of what is known as the old range ores. It did not sell any ore to outside parties, believing it to be the better policy to preserve it for its own use. It transported a large percentage of it in its own boats over the lakes, and carried a large percentage of it on its own railroad to its Pittsburg works, where it manufactured a greater variety of steel articles than almost any other manufacturing concern. It made almost everything pertaining to the iron and steel trade. In structural materials of all descriptions it made 50 per cent., in rails, 30 per cent., and in armor 50 per cent. of the production of the country.*

It was in the theory or principle of its organization, however, that the Carnegie Company was unique. With an insight into the requirements of a scientific organization of the iron and steel industry that amounted to genius, Mr. Carnegie had twenty-five years before his competitors begun the organization of his undertaking upon the principle of the accurate integration of all the branches of the industry under a unified control. He was thus working out in theory and practice a plan of organization which the great Steel Corporation was to adopt *in toto*. Mr. Schwab, the president of the company, has given us an exceedingly interesting account, in his testimony before the Industrial Commission, of the development of the Carnegie Company and its policy. He said in part:—

The original Carnegie Steel Company was a partnership. When it went into the mining of ores, it formed a separate organization for that purpose, and so with almost every other branch of its business. Its shipping industry on the lakes (the Bessemer Steamship Company) was a separate organization; the railroad (the Bessemer & Lake Erie Railroad, running from Conneaut Harbor to the works in Pittsburg, about one hundred and fifty-six miles) was a separate organization; its coke interest, limestone interest, all those various companies numbering some twenty-six or twenty-seven, were all separate organizations. But the controlling interest of each was held by the Carnegie people. In fact, Mr. Carnegie himself retained a controlling interest in all, owning something over 50 per cent. in each of the companies.

It was then found that this partnership had grown so large and the

* Testimony of J. C. Schwab before the Industrial Commission.

business was of such a varied character, there were so many companies to control and so many partnerships holding varied interests, that for the sake of harmony among our partners it was decided to put all in the control of one corporation, to be known as the Carnegie Company. One of the chief reasons for that was Mr. Carnegie's idea that a partner in the coke interest, for example, should not have a greater interest in coke than he had in steel, as it might affect the contracts between the two companies; or that a partner should not have a greater interest in shipping than in the steel company. So he put these interests all into one company, so that each partner's interest was as a whole.

Something of a diversion has been made in order to give this account of the Carnegie Company, because it constitutes such an important step in the evolution of the iron and steel industry in this country, because it affords an unusually definite presentation of the reasons dictating the consolidation of allied interests into a single corporation, and because it undoubtedly pointed the way and furnished the model for its great successor, the United States Steel Corporation.

Returning now to a consideration of this latter combination, it is, of course, too early to attempt a forecast of what its ultimate influence will be upon the industry and upon the public welfare. If our position in the matter, however, is correct, there seems to be no reason to apprehend anything like an effective monopoly of the trade being organized by the corporation. Practically, all of the testimony before the Industrial Commission, including that given by independent operators, was against any such idea. There are now, as we have seen, a large number of plants outside of the corporation; and the building of new mills seems, if anything, to have been stimulated by the events of the past year.

The policy of the company, moreover, would seem to be, not in attempting to lessen outside competition, but in seeking to bring about a more perfect organization and integration of its own properties. Its work, in the immediate future at least, lies in strengthening its weak departments, in securing an adequate supply of ore, coal, lime, and other necessary material, in seeing that its coke ovens are sufficient for the needs of its manufacturing plants proper, that it has certain and adequate facilities for transportation, that the production of the mills in one department correspond with the needs of the

other, etc. The strength of the corporation in competition with other plants will thus be its perfect control over all the factors of production, transportation, and distribution, its ability to make its operation correspond accurately to the needs of the market, and its power, through the large scale upon which its operations are carried on, to engage in foreign trade, and thus emancipate itself from the limitations and fluctuations of a purely domestic demand. It is, of course, quite possible, if other iron and steel companies pursue the same policy of building up self-contained organizations, as indeed a number of them are already doing, that the time will come when the competition between them and the Steel Corporation will be a serious matter. When that time arrives, the old tendency of combination to restrict competition will again become dominant.

The formation of the United States Steel Corporation is by no means an isolated example of integration on an extensive scale in this country. In this same industry we have the important example of the Pennsylvania Railroad interests acquiring the control of a number of great steel works and of the projected combination of armor plate mills, gun factories, and shipyards, so that all the operations of ship-building, and especially the complete construction and equipment of war vessels, may be carried on by the same concern. In the former case it is of interest to note that the motive of the railway company in acquiring steel works was not only that it might be independent of outside mills for its rails and other steel material, but that through them it could control the transportation of the large quantities of freight that their operation necessitates. This is the same motive which in the past had led to the close union of interests of the coal mining industry and of the roads by which the coal must be conveyed to its markets. It is solely through the integration of these two industries that a unified control was secured of the anthracite coal trade.

In the transportation industry can be found evidences of the working of the force of integration in a great variety of ways. Several of them have been mentioned in the preceding paragraph. Of others, the most important is that whereby a close community of interests is being established between railroad

and ocean transportation. The purchase of the Leyland Line by J. P. Morgan & Co. was for the purpose of permitting a closer relationship between the business of the railways bringing freight to the seaboard and its subsequent carriage to foreign parts. It is indeed rumored that this purchase is but a part of a far greater scheme for the close alliance of related interests. The comments of Bradstreet's on this purchase are exceedingly pertinent to the subject we are studying, and will bear reproduction, even though they are at some length. In its issue of June 1 of the present year it says:—

One of the most troublesome elements in the railroad rate situation has long been the tariffs on export business, in making which both railroad and steamship rates have to be considered. With an abundance of ocean tonnage under the control of the trunk line railroads or in the hands of a management in alliance with them, the problems arising in connection with export rates and their relation to domestic transportation could manifestly more easily be solved than in the past, when the great majority of ships which transported the export freight brought to the seaboard by the railroads were in the hands of independent and foreign owners.

At the same time it is evident that plans for the development of export business on the part of the United States Steel Corporation or the bituminous coal roads required the absolute command of ocean transportation on a large scale, and would furnish further reasons for the Leyland deal, as well as for others of the same character which are supposed to be under investigation. . . . Increased attention is being drawn to alliances between railroad and steamship interests generally. Such arrangements are by no means a new thing. Various American roads already have close relations to or an ownership in various steamship lines, an instance of which is furnished by the C. & O. fleet, which transports grain from its Newport News terminus to Europe. The close connection which exists between the Pennsylvania Railroad and the American Line and Red Star Line steamers is another instance, while the Canadian transpacific service is another notable example. The Great Northern, it will be recalled, is now building a fleet of twenty thousand ton vessels for the Pacific service to be operated at the East and the Puget Sound terminus, while the Union Pacific, being now in practical control of the Pacific Mail Steamship Company, already possesses facilities of that character. . . . Indications, in fact, are that on both the Atlantic and Pacific a large proportion of the ocean tonnage will be before long in the hands of or under the control of the large American railroad systems, and will be worked in direct harmony with them.

Another example in which this purpose of bringing together related interests rather than concentration in a distinct field is peculiarly manifested may be found in the control recently

obtained by the Standard Oil Company of the American Linseed Oil Company. The Standard was already in control, through its directors, of the National Lead Company. There were thus brought under the same general management, or at least under sufficient control to insure that they would work in harmony with each other, the concern having the larger proportion of the output of linseed oil in the United States, and the company controlling the greater part of the production of white lead, or the product in which linseed oil finds its chief employment. There are also strong indications that the Union Lead and Oil Company and other concerns will also be taken in, and all run in relation to each other.

Still another example of the bringing together under one management of all the different branches of a trade, which has taken place during the past year, is the merging of the American Tobacco Company, which had the largest production of cigarettes in the country, the Continental Tobacco Company, the leading manufacturers of chewing and smoking tobacco, the American Snuff Company, the most important of the snuff concerns, the American Cigar Company, the International Cigar Machine Company, and the Havana American Company in a single corporation, the Consolidated Tobacco Company. The magnitude of this combination may be seen from the fact that the capitalization of the companies taken was over two hundred million dollars.

It will scarcely be necessary to multiply examples further. If a careful analysis of all the recent important considerations be made, it will be seen that in almost all cases the essential purpose in view has been the merging of related interests rather than the taking over of distinctly competitive concerns.

Of integration in the distributive branch of industry, the chief example is, of course, that of the familiar department store. Here, however, the real forces of integration are not present to the same extent that they are in the other examples that we have mentioned. The gathering together in the same establishment of the numerous branches representing as many branches of trade is not the result of any integral relation of independence between the different departments. Their union

is rather to obtain the advantages resulting from centralization of management, and of ministering to the convenience of customers by making it possible for them to find many of the articles they desire under one roof. The scale on which these stores are conducted, however, make it possible for them to establish closer and more immediate relations with producers, and thus bring about a real integration. Many of the stores maintain not only extensive repair and custom-making departments, but to a considerable extent engage in the direct manufacture of articles handled by them. Where this is not done, the stores often enter into such close relations with manufacturers that the arrangement is almost one of partnership. The jobber and other middlemen are eliminated to a considerable extent.

Another example of the integration of industry, though it has not yet reached a position of great importance, is that of the union of the work of production and distribution in the same hands, as is seen in the practice, now quite common, of manufacturers of shoes, such as the Douglas, the Regal, the Crawford, and other companies to open retail stores of their own in the chief cities of the country for the disposal of their products. In Great Britain the Mansfield Shoe Company has carried this system to a high development. Not only has the company one or more stores in each of the chief cities of Great Britain, but its stores are found in many of the cities of the Continent.

This tendency which we are considering can also be seen in fields in which its occurrence would not at first be anticipated. The rise within recent years of the great trust and security companies is an example of pure integration. Here we have one big corporation performing a great variety of functions, which were formerly distributed among as many institutions. It is not unusual for the same company thus to act as a bank, as the administrator of estates, as real estate agent, as guardian of valuables, as bonding agency, as conveyancer of properties. Either itself, or through companies acting in close relations with it, it also examines titles, places insurance, and performs other duties of fiduciary or legal character.

The present article is intended primarily to cover the move-

ment towards integration in this country. It is a matter of interest, however, to note that this tendency is also strongly seen in industrial combinations taking place in England. Thus a recent writer in the *Contemporary Review* says : *—

There is a very distinct trend in the direction of the formation of large companies organizing for themselves departments of industry in which all operations from the supply of the raw material to the turning out of the finished article remain in the same hands. The process is not complete in all cases, but we can point to a number of cases showing various aspects of the movement. Since the union of the Whitworth and Armstrong Companies, the joint concern has acquired a large interest in the engineering and ship-building company of Robert Stephenson & Co., in order to have a graving dock at its disposal. Vickers, Son & Maxim, Ltd., beginning as armor plate manufacturers, absorbed the Naval Construction and Armament Company, and can now boast that they can turn out a battleship completely equipped in every respect. The purchase of the Clydebank Engineering and Ship-building Company by the old Sheffield firm of John Brown & Co. affords another case in which everything from the coal and iron ore to the ship ready for launching can be provided by the same company. Guest, Keen & Co.—in which are united the Patent Nut and Bolt Company, the Dowlais Iron Company, and Guest & Co.—belong to the same class ; and we may add that their directors are among the latest who have gone to learn in the school of the United States Steel Corporation. James Dunlop & Co., iron-masters and colliery owners, have followed the same path by purchasing the Calderbank Steel Company ; and Robert Napier & Co., ship-builders, have similarly united with Broadmore & Co., steel and armor plate makers. A new line has been struck out by the Thomas Iron Works, which, after widening their scope by the absorption of the engineering works of John Penn & Sons, have lately formed a combination with Messrs. Siemens, Messrs. Mather and Platt, and the Brush Electrical Engineering Company for the purpose of undertaking electrical equipment on equal terms with the great German and American combinations.

Great Britain offers still another example of the integration of industry that is in every way remarkable, that of the great system of co-operative consumption based on the Rochdale principle of division of profits. This system merits careful study, as it constitutes probably the most interesting example of the results accomplished by the steady working of the

* "The Billion Dollar Trust," by Henry W. Macrosty and S. G. Hobson, *Contemporary Review*, September, 1901. Strangely enough, these writers do not see that the steel trust which they are describing is an example *par excellence* of the tendency towards integration. They speak of combinations described in the paragraph quoted as peculiarly a product of British soil, and add "of amalgamations on the model of the American Trust there are but few."

force of integration that can be found in any country, and because it is one the significance of which in this connection has never been pointed out.

In 1884 a small group of twenty-eight men met at a house in Toad Street in the town of Rochdale, and organized a co-operative store on a principle entirely different from that which had ever been applied in previous co-operative undertakings. This was the principle that the store should be run by the customers as co-operators, and that all profits realized should be distributed among them in proportion to the value of their purchases. This simple and equitable basis for co-operation meeting with success, the undertaking was taken up elsewhere, and soon throughout the kingdom there appeared societies or co-operative stores organized on the same model. By 1864 there were in existence not less than 500 such societies with over 125,000 members, and total sales exceeding \$14,000,000 a year.

The time was now ripe for the next step in this wonderful development of an industrial system. These societies were evidently compelled to enter the market as purchasers of goods to the extent of their sales to their members. To a very large extent the stores, appealing as they did to the same classes of the population, handled the same goods. The idea of establishing some form of co-operation among the societies by which their purchases might be made in common naturally suggested itself. The result of efforts to put this idea into execution was the founding in 1864 of the British Co-operative Wholesale Society, the function of which should be the acting as purchasing agent for the co-operative stores constituting its membership. In its organization the Rochdale system of division of profits, according to purchases, was rigidly applied, only now the co-operative societies, instead of individuals, were the beneficiaries.

This society proved no less successful than that of the individual stores. Starting with sales of over \$250,000 during thirty weeks in 1864, its volume of business increased by leaps and bounds. In 1873 its net sales passed the five million dollar mark, in 1876 the ten million dollar, in 1882 the twenty million dollar, in 1891 the forty million dollar mark, and in

1899 represented the enormous sum of seventy million dollars. In the mean time, or in 1868, the Scottish Co-operative Society had been formed to serve the same purpose for the Scottish co-operative stores. Its progress, proportionately to the territory that it served, was even more rapid, its net sales in 1899 amounting to twenty-five million dollars. This growth in co-operative wholesale distribution was, of course, the outcome of the continued development of the individual co-operative stores. These had in 1898 reached the total number of 2,357, of whom 2,130 reported in 1898 1,703,098 members, and total sales during the year of \$340,000,000.

Thus was accomplished the first great step in the integration of industrial operations under this system, that of the close union of the wholesale and retail business. There remained yet the fields of production and transportation to be entered. As the wholesale societies became the purchasers of enormous quantities of certain staple products, the question again arose whether these could not be secured directly by their manufacture by the societies instead of by purchase from independent concerns. A beginning was accordingly made in the early seventies by the opening of works for the manufacture of a few articles. The experiment, meeting with success, has been successively extended to other articles, until to-day both the British and the Scottish Wholesale Societies are manufacturing articles on a huge scale. Thus among the manufacturing plants of the British Society may be mentioned the great boot and shoe factories at Leicester, with a weekly output of over 35,000 pairs of shoes; the Dunston flour mills, turning out 8,000 sacks of flour a week; the tobacco works at Manchester, with yearly sales of nearly one and a half million pounds of tobacco, valued at over one million dollars; the Batley Woollen Mills, with a yearly production valued at more than two hundred thousands of dollars. Other articles manufactured by it on a scarcely smaller scale are lard, soap, candles, confectionery, preserves, pickles, cocoa, hosiery, furniture, clothing, corsets, biscuits, crackers, etc. Finally, it has even entered the farming industry, in order to produce its own milk, eggs, cheese, fruits, etc.

In 1876, owing to the rapid growth in its European trade, it

purchased a small vessel for the transportation of its purchases. In 1879 another vessel was built for it. Other vessels have since been added, until the society now owns and operates a fleet of seven vessels, the total cost of which was over \$400,000. Other branches of activity of the society are the maintenance of central banking institutions for the benefit of the societies, and the provision of fire, accident, and life insurance, while the individual societies carry on extensive operations in the way of granting loans to its members for the erection of houses.

Space does not permit us to give a similar account of the entrance of the Scottish Society into the field of production. Suffice it to say that its operations in this direction are relatively no less important. We have entered somewhat into detail in tracing the history of the co-operative movement in Great Britain, as it furnishes a most remarkable illustration of the integration of the different branches of industrial work in one harmonious system. Based on a pure co-operation of consumers, we have here the operation of production, transportation, wholesale and retail distribution, banking and insurance, all carried on in one finely organized system, in which relative rights and interests are perfectly adjusted.

Little would be gained by carrying further this description of the ways in which the tendency towards integration is now working. Attention should rather be given to a closer analysis of the causes of this movement, and what will be some of the more important results. Great movements, such as we are considering, rarely take place in response to a single cause. In the present case, thus, it is possible to distinguish a number of quite distinct motives leading to union of related industries under the same management. First, and primary among these, must be noted that of the desire of manufacturers to render themselves independent as regards the supply of all the raw materials needed by them in their enterprise. With the increasing concentration of industry this consideration has become one of greater and greater importance. When a manufacturer had a choice of a score or hundreds of concerns to which he could turn for the supplies of which he had need, and these concerns were in comparatively active competition with

each other, there was every surety that these supplies could be obtained when needed, and at a reasonable cost. When, however, the manufacturer, on the one hand, now enters the market as a purchaser of materials on an enormous scale, and, on the other, finds but a few firms from which these materials in the quantity required can be obtained, conditions are entirely different. The same is true in regard to the producers of the raw materials. Where they had hundreds of purchasers competing for their products, they have now but a score or less. From the standpoint of both parties, therefore, independence has given way to dependence.

As this condition of affairs became more marked, it became inevitable that the one should seek to secure a definite control over the products of which he had need in his manufacture, and that the other, as markets were closed to him, should seek, by broadening the scope of his operations, himself to convert his materials into finished products ready for consumption. In a way the force leading to integration may be said to be much the same as that which impels each nation to become, as far as possible, self-contained in respect to the supply of articles of which its citizens have need, or are believed to be necessary for its national life and progress.

In the above we have given a description of what is believed to be the prime cause of the movement towards integration. A briefer reference will suffice for some of the secondary motives. Among these will be first noted that of congested capital seeking investment. There is no doubt that some of the earlier combinations have earned for their promoters or members enormous profits. At first these profits could be profitably invested in the industry itself through its further development. In time, however, this, in many cases, became difficult. In seeking for new openings, it is natural that the choice should be made of collateral or related industries, the manufacture of articles hitherto purchased, or the more complete transformation into finished products of articles previously sold to other manufacturers.

Still another motive is that of undertakings which have secured a virtual monopoly of a great product seeking to eliminate the competition exerted by a substitute product. There

are very few articles, as Professor Ely has excellently brought out in his recent work on trusts and monopolies, for which substitutes do not exist, and to which the public will have recourse if the prices demanded for the article of first choice is excessive. This may be said to be the motive dictating the entrance of the Standard Oil Company into the field of the production of other than petroleum oils, though in this case there were other reasons, resting upon technical considerations.

Finally should be mentioned the motive of realizing the economy that may be gained from the elimination of the middleman, or those standing in any way between the production of the raw material and the final distribution of the finished product to the consumers. As the magnitude upon which industrial operations are carried on increases, possibilities of economy in this way become greater. Closely allied to this motive is also that of making a more effective use of by-products. This fact alone is responsible for the same concern, in a number of very interesting cases, operating directly what, at first sight, would seem to be a very large number of dissimilar undertakings.

Turning now to a consideration of what will probably be the effects, good and bad, of this movement, we shall have to limit ourselves to a very general examination. The movement is as yet too young to permit of any accurate forecasting of the ultimate results as regards the details of our industrial system. It is scarcely necessary, however, to comment upon its possible overwhelming significance. There are definite limits to the progress of concentration, and these seem to have been reached in a number of cases. There are practically none to that of integration. It has already given us a billion dollar corporation, although its influence as a definite force has only recently begun to be distinctly felt.

In the future progress of this movement there is one industry in which it would seem that the conditions are peculiarly favorable for its operation. This is the great industry of railway transportation. The peculiarity of this industry is that it is at once dependent upon all the other industries for its successful exploitation, and all the other industries are in a like manner dependent upon it. We have given above one or

two instances where this interdependence has led to integration. These cases, however, are insignificant in comparison with what might take place. The railroads, to an extent equalled by almost no other undertaking, are enormous purchasers of certain articles, such as rails, cars, structural material, and other supplies. These articles, moreover, are ones for which a steady and certain demand exists year after year. The time may very easily come when the roads will abandon the policy of depending upon outside concerns for the supply of the materials and equipment of which they have need, and undertake, as is now done in isolated cases, their direct manufacture. With their lines reaching all the mines or other sources of supplies of which they have need, and with the possession of certain markets for what is produced in their own needs or the ability effectually to distribute any surplus, the roads are in a peculiarly favorable situation for the manufacture of a large number of products. If their charters will not permit this to be done directly, the same result can be accomplished through closely affiliated companies, as is now done by the Pennsylvania Company through the Conemaugh Steel Company.

The question may legitimately be asked why, in view of these circumstances, if integration is such a strong force, the roads have not already entered these fields; why, as regards their most immediate needs, such as cars, direct manufacture has not been more resorted to. The explanation lies in the fact that the evolution of the railway systems in this country has not yet advanced far enough to make this desirable. During the past as well as at the present time the great problem confronting the railroads is the building up of systems through which effective control can be obtained of particular territories or lines of traffic. So overwhelming in importance is this consideration that all other considerations have for the time to be left in abeyance. In the contest for supremacy the greatest arm is the possession of capital with which other railroad property needed for the rounding out of the systems can be acquired. It is thus the height of folly for any considerable sum of capital to be devoted to other purposes, unless an absolute necessity for such expenditure exists.

The time is now rapidly approaching, however, when these systems will be comparatively perfected, and the greater part of the country be divided up among a few great systems of railroads. When this is accomplished, a radical change may be looked for in the policy governing railroad administration. Energies will then be turned exclusively to the efficient equipment and operation of the properties. The different lines of the systems must be reconstructed, so that they may be welded into one harmonious whole. The matter of securing supplies and equipments at the best possible rate will receive the most careful attention, and the time will then have been reached when the desirability of the roads themselves manufacturing the articles of which they have need will be considered purely as a problem in the cost of production and control over a necessary element in the operation of their properties.

To what extent the railroads will ever become manufacturers on a large scale it is now impossible to predict. That they will do much more than they are now doing would, however, seem extremely probable. Should, moreover, the time ever come when there will be an integration of industries, as well as an integration of related branches of an industry, the railroads of the country would furnish the connecting links binding the different departments together.

It would be a hardy prophet who would seek to follow out all the consequences of the continued operation of this tendency. Especially would it be futile to attempt to weigh the social effects that would result from the concentration of such enormous power in the hands of a few individuals. Of one result, however, we may speak with comparative certainty. Each step in the direction of integration implies a lessening of possible friction and a substitution of a direct for a more indirect method, and both of these mean greater economy and increased efficiency of production. With this will also come an enormous strengthening of control over the factors of industrial operations. Just as it was the writer's opinion, as expressed in his former communication that has been referred to, that the greater control resulting from the concentration of industry would have as one of its most important consequences the steadying of production and the resulting less-

ening of industrial depressions, so it is believed that the far greater control that will follow from integration cannot but work in the same direction. Here, however, we are treading upon more uncertain ground. The causes of industrial depressions are too complicated and too little understood to permit of confident statement.

In conclusion, it is of not a little interest to note how perfectly this tendency towards integration fits in with the theory of evolution as applied to industrial progress. Evolution as a method of progress, stated in the simplest terms, may be said to be the differentiation of functions and the concomitant integration of parts. With the rise of the modern industrial system began that differentiation of function which is known as division of labor. Particular duties or operations were assigned to particular units. In the beginning this was the most important feature of the changes that were taking place. With this diffusion of duties largely accomplished, there now rises, as the factor of prime importance, the second element of evolution, that of integration, by which the various interdependent parts are being knitted together into a more harmonious whole.

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